4)This gel is poured in Teflon beaker of capacity 100 ml and kept in acid digester bomb.

5)The acid digester bomb is kept in Oven at Temp. 250 -270^{0}C for 14 days.

6)The resulting compound is washed with water four to five times and finely by ethanol

7)It is kept for drying at 80^0 C for one hr.

PART II: Characterization of synthesized material by using XRD,SEM &DTA technique.

1) XRD: Structural determination, Phase composition

2)EDAS: Percentage composition of compounds

3)DTA/TGA :Determination of free water and structural water

4)SEM: Determination of particle size and surface morphology

PART III: Study the applications to ion exchange,catalytic property, CO_2 adsorption capacity etc of theses synthesized compounds.

REFERENCES

Akhilesh T., John B. Parise, (2002), Hydrothermal synthesis and structural characterization of the aluminogermanate analogues of JBW,montesommaite, analcime and paracelsian. *Microporous and Mesoporous Materials.* **52:** 65–78.

Behrens E.A., D.M. Poojary, A. Clearfield, (1998), Structure and ion exchange properties of tunnel type titanium silicates, *Chem. Mater.* **10:** 959-967.

Behrens E.A., D.M. Poojary, A. Clearfield,(1998), Synthesis,structure determination and characterisation of Mn(III) phenyl phosphate, *Materials Research Bulletin*, **33:** 1265–1274.

Cho H.H., S.H. Kim, Y.G. Kim, Y.C. Kim, H. Koller, M.A. Camblor, S.B. Hong, (2000), Structure of the novel large pore gallosilicate TNU-7. *Chem. Mater*. **12:** 2292- 95.

Dadachov M.S., W.T.A. Harrison, (2001), New Mixed Framework Compound with Corrugated [Si_6O_{15}] Layers. *Solid state chem.* **156 :** 135-142.

Dadachov M.S , Xiaodong Zou, (1997), Synthesis and Crystal Structure of $Na_4[(TiO)_4(SiO_4)_3]\cdot 6H_2O$, a Rhombohedrally Distorted Sodium Titanium Silicate Pharmacosiderite Analogue, *Solid State Chem.* **134:** 409-413.

Dean, John A. (1995). The Analytical Chemistry Handbook. *New York: McGraw Hill*, Inc.pp.15.1–15.5.ISBN 0070161976.

Dianlai Y., Jie Z., Edwin Y. Pun, H. Lin., (2010), K^+-Na^+ ion-exchanged sodium magnesium aluminum germanate glass waveguide amplifier operating in the first telecommunications window. *J. Appl. Phys.* **108:** 1003-1006.

Eulenberger G.,H.Nowotny A.,Wittmann,(1961),$Na_3Hx(H_2PO_4)x[(GeO)_4(GeO_4)_3]$:A distorted germanium pharmacosiderite analog with anion/cation exchange capabilities.*Chem Montach.*, **92 :** 949-952.

Feng S. , M. Greenblatt, (1992), Preparation, characterization and ionic conductivity of novel crystalline, microporous germanates, $M_3HGe_7O_{16}.xH_2O$, M = NH_4+, Li+, K+, Rb+, Cs+; *Chem. Mater*. **4 :** 462-467.

Feng S, Xiao, Yu H., Yi Y., Xiangju M., Miao Y., Shuo W., (2002), Hydrothermally Stable Ordered Mesoporous Titanosilicates with Highly Active Catalytic Sites. *J. Am. Chem. Soc.* **124 :** 888–889.

Geoffrey M. Johnson, Akhilesh Tripathi,John B. Parise,(1999), Novel Routes for the Preparation of a Range of Germanium Containing Zeolites, *Chem. Mater.* **11:** 10-12

Hagele G., F. Machatschki, (1937), Syntheses des Alumopharmakosiderits;Formel und Struktur des Pharmakosiderits. *Fort.Min.* **21:**77-81.

Hailian Li, M. Eddaoudi, D. A. Richardson, O. M. Yaghi, (1998), Porous Germanates: Synthesis, Structure, and Inclusion Properties of $Ge_7O_{14}.[(CH_3)_2NH_2]_3(H_2O)$, *J. Am. Chem. Soc* **120:** 8567-8568.

Hartley E. G. J. (1900) Uber die Zusammensetzung der natUrlichen Arsenate und Phosphate. *Kristollgr*. **32 :** 220-226.

Heide F. (1928), Uber eine hydrothermale Paragenesis von Quarz und Arsenmineralien in ver&nderten Quarzporphyr vom Saubacki.V. und Uber einige Eigenschaften des Pharmakosiderits und-des Symplesits. Z. Kristallogr. 67: 33-90.

Jiho S. ,D. Bhange, Miguel A. Camblor, S. Bong Hong,(2009), Synthesis and structural characterization of aluminogermanate pharmacosiderites with different crystal symmetries,*Microporous and Mesoporous materials*.**13:** 148-57.

Knoll, Max (1935). Aufladepotentiel und Sekundäremission elektronenbestrahlter Körper. *Zeitschrift für technische Physik* **16:** 467- 475.

Laudise, R.A.(1986).*Hydrothermal Synthesis of Crystals. C&EN* September, **28:**30 - 43.

O'Donoghue, M. (1983). *A guide to Man-made Gemstones*. Great Britain: Van Nostrand Reinhold Company. pp. 40–44.ISBN 0-442-27253-7.

O'Neill M. J. (1964). The Analysis of a Temperature-Controlled Scanning Calorimeter. *Anal. Chem.*, **36:** 1238–1245.

Pilar P, Miguel A. Garcia-G.,.R. Garcia A. Clearfield, (1999), Synthesis, Characterization, and X- Ray Powder Structure of $K_2ZrGe_2O_7$, *chem matter,* **148:**41-49.

Proust, (1790), Fer mineralise par l'acide arsenique. *Ann. Chem.* **1:** 195-197.

Pungor, Erno (1995). *A Practical Guide to Instrumental Analysis*. Florida: Boca Raton. pp. 181–191.

Roberts M. A. , A. N. Fitch (2001). $Na_4Ge_7O_{16}\cdot 6H_2O$ and $Na_{2.6}Rb_{0.8}H_{0.6}Ge_7O_{16}\cdot 6H_2O$ refined from powder synchrotron X-ray diffraction data. Zeitschrift für Kristallographie. **216 :** 225-229.

Strohmaier K.G. , D.E.W. Vaughan, (2003) ,Synthesis and Structure Determination of the Hierarchical Meso-Microporous Zeolite ITQ-43, J. *Am. Chem. Soc*., **125:** 1131-34.

Skoog, Douglas A., F. James Holler and Timothy Nieman (1998). *Principles of Instrumental Analysis* (5 ed.). New York. pp. 805–808. ISBN 0030020786.

Spezzia, G., (1905), Hydrothermal Growth of Quartz Under Specific Conditions and the Raman Spectra of Ion Species in a Hydrothermal Growth Solution, *Accad. Sci. Torino Atti* **40:** 254.

Tang J, Liu J, Yang J, Feng Z, Fan F, Yang Q. (2009), Mesoporous titanosilicates with high loading of titanium synthesized in mild acidic buffer solution. *J Colloid interface sci.* 15: 335-338.

U.S.Patent, 2009, 3,263,484.

US Patent 1992.5096,686, 541.

Warrender S.J. , P.A. Wright, W. Zhou, P. Lightfoot, M.A. Camblor, C.H. Shin, D.J.

Kim, S.B. Hong, (2005) TNU-7: A large-pore gallosilicate zeolite constructed of strictly alternating MOR and MAZ layers, *Chem. Mater*. **17 :**1272 – 1276.

Woo, S.B. Hong, S.H. Lee, C.H. Shin, L.J. Alvarez, C.M. Zicovich-Wilson, M.A. Camblor, (2004), J. *Am. Chem. Soc*. **126 :** 13742-13745.

Wunderlich, B. (1990), *Thermal Analysis*. New York: Academic Press. pp. 137–140. ISBN 0127656057.

Zemann J. (1959) , Isotypie zwischen Pharmakosiderit und geolithischen. Germanaten, *Acta Crystallogr*. **12 :** 252-256

Zimny K., C. Carteret, M. J. Stébé, and J. L. Blin,(2011) Multitechnique Investigation of Mesoporous Titanosilicate Materials Prepared from Both the Self-Assembly and the Liquid Crystal Mechanisms. *J. Phys. Chem*, 115: 8684–8692.